

RD1 Update 11_3_2014.

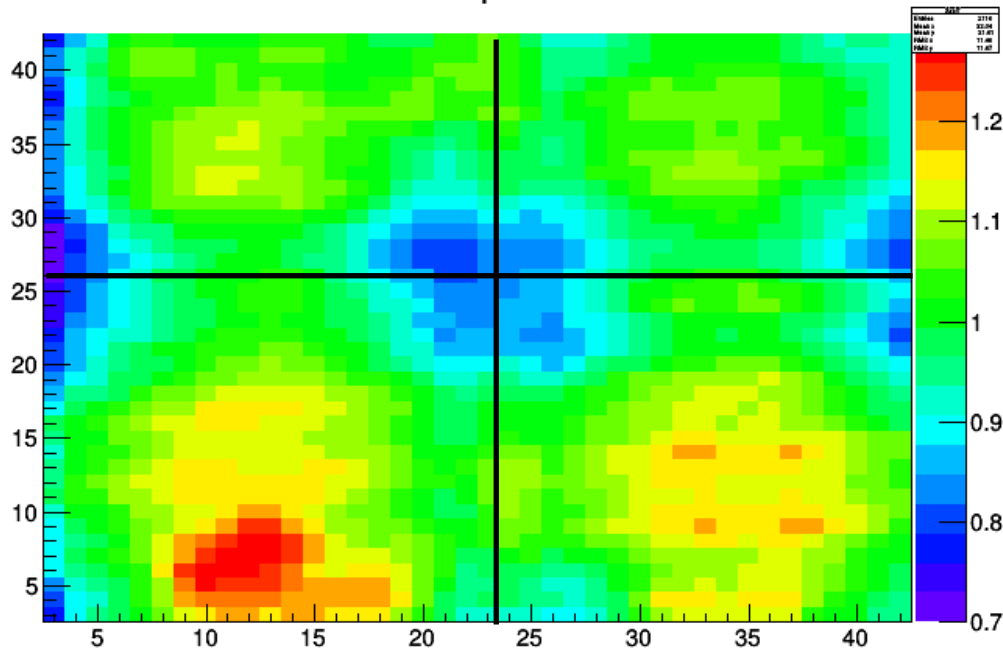
- Compact Readout.
- Absorber materials for high resolution EM prototypes
- Absorber materials mechanical properties
- Industrialization

O.Tsai . (UCLA)

Forward EM prototype tested at FNAL was re-worked for scans with UV LED. Front face was machined and polished.

Scans were performed on all four superblocks, revealing same picture. The drop of the signal (sum from four individual towers) when LED is inbetween towers is about 20% compare to hottest spots in the middle.

Sum vs position



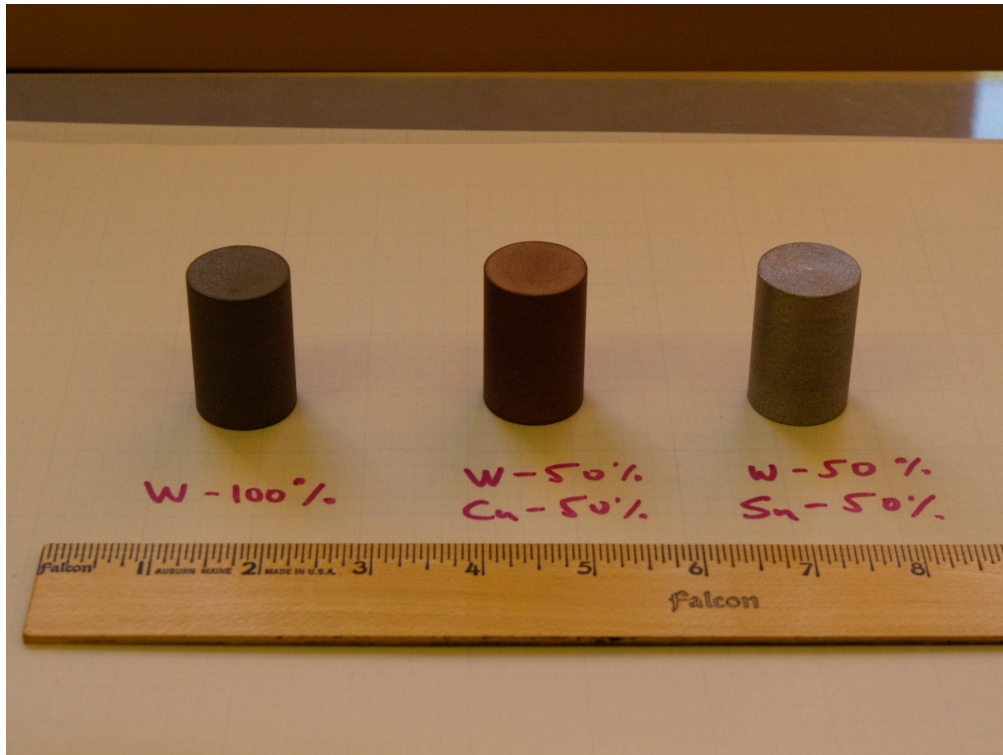
This is consistent with test run data.

The next step is to create ND filter which will be printed on ~ 5 mm thick acrylic, to which trapezoidal light guides (same dimension as was Used at FNAL) will be glued.

Then repeat scans in the lab with LED source.

Mechanics is at machine shop.

- Absorber for new prototype.
- Tested three types of powder to be mixed with W powder used in previous prototypes.
- Cu, Cu -100 mesh, Sn – 100 mesh. Mixing and infusion of epoxy in two composites W/Cu and W/Sn (50%/50% by weight) went well.



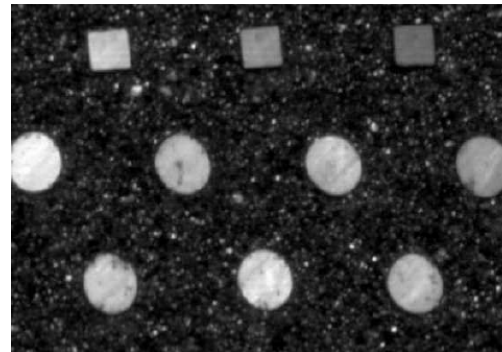
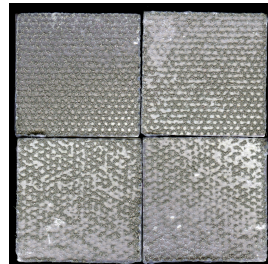
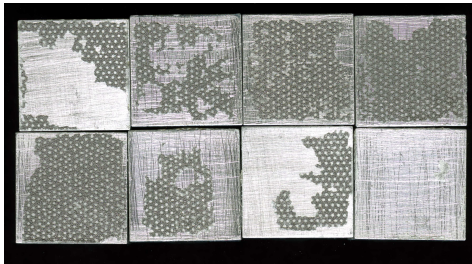
Density of absorber can be easily Diluted (density of W/Sn sample Is about 50% of our previous prototypes).

It seems that machinability of W/Sn sample is much better too.

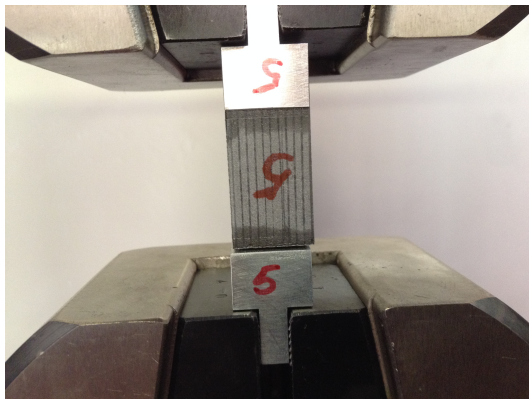
Next step is to perform optimization of active absorber (composition of W/Sn, fibers).

Had meeting with Alexander K. when we set first test geometry.

Old Absorber material, mechanical properties (Poor man engineering).



W/ScFi
Compound
Mechanical
properties.



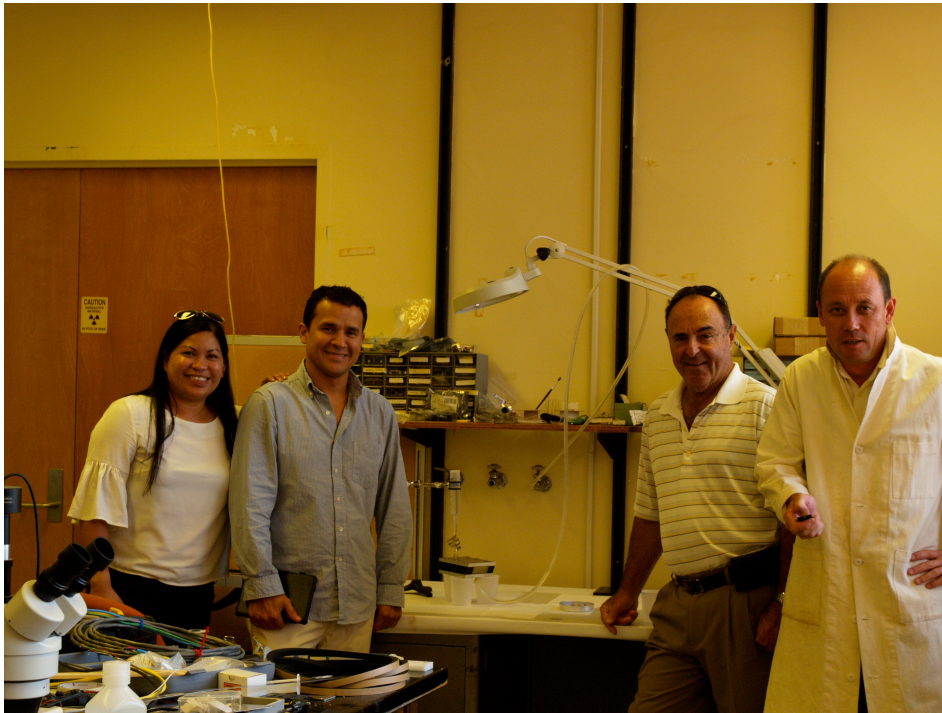
- Young's Modulus - $2 * 10^{11} \text{ N/m}^2$
- Shear Modulus - $7.5 * 10^{10} \text{ N/m}^2$
- Bulk Modulus - $2.4 * 10^{11} \text{ N/m}^2$

Parameters close to construction steel.

- Gluing tests. Two series one with 40 thermal cycles 20-32 Deg C. Probably will use Epotec and Hysol E-30HT to prepare 12 samples for year long exposure at STAR in Run 15.
- Hysol E-30HT, break W/ScFi compound at $\sim 6.4 \text{ ksi}$.
- Need to do optical properties under load, not started yet.
- THP potentially found the right way to machine W/ScFi compound (no damages to fibers), need to get from them large sample and perform checks.

Industrialization:

- Two meetings with THP people at UCLA in past two months. During second meeting, demonstrated part of the production cycle, look at tooling, provide all necessary information (drawings, vendors of components etc..)



Beyond THP:

Week of Dec. 8, 2014

Two persons from PHENIX
And two from UIUC will be
at UCLA. Same transfer of
technology as with THP.